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Chapter 224: The Development of Technology Middle_3

Kushinji pondered for a moment and nodded. Long arrows flew easily, increasing friction to fix the trajectory—though he couldn’t explain the reasons behind these truths, he still had tangible experience and understanding.

Then, Xiulote discussed an extremely important part of the Han crossbow, the aiming device, Wangshan.

"A vertical strip should be added to the crossbow machine, with the side used to assist aiming and ensure the accuracy of the target. Also, five large divisions should be marked on it, each divided into two half degrees. Thereby determining the aiming orientation and clarifying the specific shooting angle," he explained.

At this point, Kushinji fell into thought. He looked at the diagram drawn by His Highness, found a wooden stick, and marked evenly divided angles on it. Then, he held the stick in front of the crossbow and gestured, finally having a realization.

"His Highness has a good idea!" The Master Carpenter’s praise was brief. Immediately, he raised a new concern.

"Speaking of this crossbow machine, it can hook the bowstring, waiting for the right moment to shoot, which is indeed a great idea!

But this small part bears a huge force, and after just a few dozen shots, it begins to deform, especially at the bottom pin and where the crossbow arm combines. This area is easily damaged, and I have already repaired it once. How can such a fragile weapon last on the battlefield?"

As he spoke, Kushinji pointed at the lower end of the crossbow machine, already showing significant wear and deformation, and this was just a light wooden crossbow.

Xiulote was silent in thought. He recalled the crossbow machines excavated from the Han Dynasty, which were made of bronze on one hand and seemed to have a specific case on the other. The young man pondered the principle and analyzed it to give detailed suggestions.

"The crossbow machine could be made of tough and wear-resistant sandalwood or ironwood, or even solid antler. Once there is sufficient bronze, I will give you a batch to specifically make durable bronze crossbow machines.

Also, a wooden case should be installed outside the crossbow machine, letting the pin first pass through the wooden case, then slot into the hole on the crossbow arm. This external case can secure the pin, preventing it from shaking during shooting and affecting accuracy. Meanwhile, the force between the crossbow arm and the pin is distributed to both the outer case and the pin, making it more durable. By the way, since the pin is very small, it could be replaced with a copper pin. Eventually, the wooden case will be replaced with a copper case as well," Xiulote reasoned.

He thought further and added,

The invention of the external case was a significant advancement for the Han crossbow. First, it stabilized the crossbow machine with three-point fixation, increasing accuracy. Secondly, it dispersed the force from a single point to multiple points, allowing the pulling force of the crossbow to increase

exponentially, greatly enhancing its lifespan. From then on, the strong crossbow became widespread, becoming a standard issue in the Han army.

Hearing His Highness's suggestion, the Master Carpenter thought for a moment, gestured around the exterior of the crossbow machine, then slowly nodded.

"Makes sense, this should last a long time! I will make one to test today. However, how can we make the crossbow's range and power exceed that of the longbow?"

Upon hearing this, Xiulote smiled knowingly, Kushinji was eager to surpass Kuode. The young man nodded and suggested, pointing to the body of the crossbow.

"The power of the crossbow comes from the pulling force of the crossbow's body and the pull length of the bowstring. Cocking and shooting have already been divided into two independent sections by the crossbow machine. Therefore, cocking no longer requires a continuous supply of force but can utilize the explosive strength of the whole body. In other words, you can thicken, thicken, or even lengthen the crossbow's body, to exponentially increase its shooting power!"

Xiulote paused, seeing the Master Carpenter's epiphany, he continued speaking before giving him a chance to ask questions,

"Kushinji, look, these are three different types of crossbows I've designed.

The first is an arm-cocking crossbow, the stirrup crossbow. You should have heard, I proposed a new unit of pulling force, pound, when making the longbow. You need to refer to this diagram to make the actual object, roughly today's enhancement of the wooden crossbow.

The pulling force of the stirrup crossbow needs to be 150 to 200 pounds, the pull distance is about the length of a large forearm, with a maximum projection distance of one hundred eighty paces, and the flat shooting range needs to reach at least one hundred twenty paces, where it can injure a Samurai in Leather Armor. Overall, the power of the stirrup crossbow should be slightly stronger than the longbow. Every shot takes about the time of four shots from a longbow."

Seeing the Master Carpenter's surprised eyes, Xiulote couldn't help but smile slightly; this was just the beginning.

"Next is a foot-cocking crossbow, the Stirrup Crossbow. Its body needs to be further thickened, with a pulling force of 250 to 400 pounds, a semi-diagonal maximum projection of 230 paces, and a flat shooting range of 200 paces. Such a slight upward angle in shooting can completely penetrate Leather Armor at 160 paces.

This type of crossbow will become the main long-range weapon, and I will establish a large-scale unit of Stirrup Crossbow Samurai. You need to prepare for mass production, simplifying every step. It's best to have a uniform size to facilitate angle control during collective shooting.

Also, when cocking this crossbow, both feet must stand on the bow body, using the strength of the waist and legs to pull the string to the end of the thigh. Its pull distance should be half longer than that of the stirrup crossbow, and you should also wrap two layers of silk hemp around the middle of the bow body as a buffer to prevent damage during cocking. There should also be an auxiliary cocking device, roughly like this..."

Xiulote explained in detail, adding marks on the wooden board to remind Kushinji of the details to pay attention to. Unlike the Warring States, the Han Dynasty's Stirrup Crossbow did not have a foot ring; the archer directly stepped on the bow arm to cock, using both feet to exert greater force.

"The last one is a waist and leg cocking crossbow, the Heavy Crossbow. Besides being thickened, its body can be further lengthened, exceeding that of a Longbow. The pulling force of this Heavy Crossbow is between 500 to 700 pounds, with a pull distance similar to the stirrup crossbow, estimated a bit more than half a meter. Its projection range is above 250 paces, usually reaching up to 300 paces.